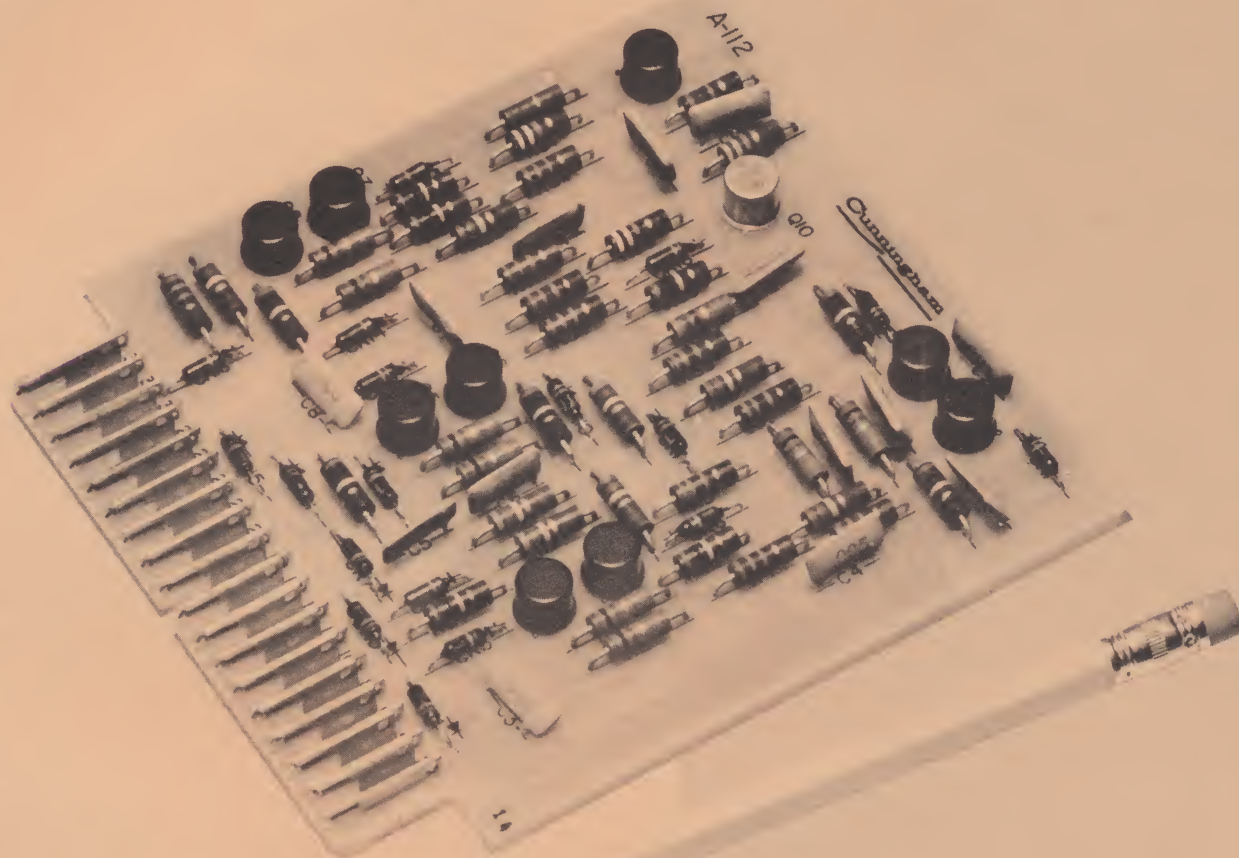


Cunningham[®]

ESTABLISHED 1838

SOPHISTICATED SWITCHING SYSTEMS

Logic Modules for Switch Control



Solid-state logic modules simplify system design; bring new flexibility and versatility to control, drive, and translation in a wide spectrum of crossbar switching applications. These modules offer all the inherent advantages of printed circuitry. Conservative design permits rapid system expansion.

REGISTERED TRADEMARK OF JAMES CUNNINGHAM, SON & CO. INC.

CUNNINGHAM LOGIC MODULE SPECIFICATIONS

MODULE NO.	DESCRIPTION	INPUT REQUIREMENTS
AO 30112	The AO 30112 is a four bit saturated binary counter with the maximum count restricted to 10, and a weighting of 1-2-4-8.	Count input: 6 volt pulse, positive going, 50 microseconds wide minimum; rise time 1.2 microseconds maximum, at 8.0 MA. Each Set Direct: -0.2 volts for 50 microseconds minimum at 15 MA plus load current for external load to negative. Reset-to Zero: 6 volt positive going pulse, 25 microseconds wide minimum; rise time 1.2 microseconds maximum at 8.0 MA.
AO 30113	The AO 30113 is a decade diode translator externally enabled by 1-2-4-8 BCD.	Each input - *True = -6 @ 150 microamps - False = -0.25 volts @ 85 MA maximum *Only when AO 30113 is driving into AO 30115. When driving other load with AO 30113, use -18 volts @ 150 microamps for true signal.
AO 30114	The AO 30114 contains ten single-stage NPN lamp drivers.	Each input - True = -0.25 volts @ 12.0 MA - False = -18 volts @ 1.5 MA
AO 30115	The AO 30115 contains ten single-stage PNP crossbar actuator drivers.	Each input - True = -6.0 volts @ 15.0 MA with source impedance of 270 ohms - False = Less than -1.25 volts at 0.5 MA to negative.
AO 30116	The AO 30116 is a diode translator externally enabled by 1-2-4 BCD and having 6 outputs.	Each input - *True = -6 volts @ 100 microamperes - False = -0.25 volts @ 55 MA max. * Only when AO 30116 is driving into AO 30118. When driving other loads with AO 30116, use -18 volts @ 100 microamps for true signal.
AO 30117	The AO 30117 contains six single-stage NPN lamp drivers.	Each input - True = -0.25 volts @ 12.0 MA False = -18 volts @ 1.5 MA
AO 30118	The AO 30118 contains six single-stage pnp crossbar actuator drivers.	Each input - True = -6.0 volts at 15.0 MA with source impedance of 270 ohms. - False = less than -1.25 volts @ 0.5 MA to negative.
AO 30133	The AO 30133 is a three bit saturated binary counter with the maximum count restricted to 6, 3 or 2 and a weighting of 1-2-4.	Count input: 6 volt pulse, positive going, 50 microseconds wide, minimum; rise time 1.2 microseconds maximum at 8.0 MA. Each Set Direct: -0.2 volts for 50 microseconds minimum at 15 MA plus load current for external load to negative. Reset-to-Zero: 6 volt positive going, 25 microseconds wide minimum; rise time 1.2 microseconds maximum at 8.0 MA.
AO 30136	The AO 30136 is a diode translator externally enabled by complimenting 1-2-4-8-16-32 binary inputs. Outputs are decimal equivalents of 0-9.	Each input - *True = -6 @ 150 microamps - False = 0.25 volts @ 30 MA maximum * Only when AO 30136 is driving into AO 30115. When driving other load with AO 30136, use -18 volts @ 150 microamps for true signal.
AO 30137	The AO 30137 is a diode translator externally enabled by complimenting 1-2-4-8-16-32 binary inputs. Outputs are decimal equivalents of 10-19.	Each input - *True = -6 @ 150 microamps - False = 0.25 volts @ 30 MA maximum * Only when AO 30137 is driving into AO 30115. When driving other load with AO 30137, use -18 volts @ 150 microamps for true signal.
AO 30138	The AO 30138 is a diode translator externally enabled by complimenting 1-2-4-8-16-32 binary inputs. Outputs are decimal equivalents of 20-29.	Each input - *True = -6 @ 150 microamps - False = -0.25 volts @ 30 MA maximum * Only when AO 30138 is driving into AO 30115. When driving other load with AO 30138, use -18 volts @ 150 microamps for true signal.
AO 30139	The AO 30139 is a diode translator externally enabled by complimenting 1-2-4-8-16-32 binary inputs. Outputs are decimal equivalents of 30-39.	Each input - *True = -6 @ 150 microamps - False = -0.25 volts @ 30 MA maximum * Only when AO 30139 is driving into AO 30115. When driving other load with AO 30139, use -18 volts @ 150 microamps for true signal.
AO 30140	The AO 30140 is a diode translator externally enabled by complimenting 1-2-4-8-16-32 binary inputs. Outputs are decimal equivalents of 40-49.	Each input - *True = -6 @ 150 microamps - False = -0.25 volts @ 30 MA maximum *Only when AO 30140 is driving into AO 30115. When driving other load with AO 30140, use -18 volts @ 150 microamps for true signal.
AO 30141	The AO 30141 is a 6 PNP buffer card.	"On" condition: -3 Volts @ 10 MA maximum, input impedance approximately 300 ohms. "Off" Condition: -.25 to plus 6V or open circuit. Input impedance approximately 2.3K to plus 6V.
AO 30157	The AO 30157 is a 10 PNP buffer card.	"On" condition: -3 volts @ 10 MA maximum, input impedance approximately 300 ohms. "Off" condition: -.25 to plus 6 volts or open circuit. In impedance approximately 2.3K to plus 6V.

All Modules Listed Above Use Operating Frequency: 0 to 1 KC; Operating Temperature

OUTPUTS

POWER SUPPLY

False = -0.25 @ 100 MA with load impedance greater than 180 ohms to -18 volts.
True: -11.5V @ 2.5 MA with load impedance greater than 4,000 ohms to ground.

-18 volts @ 80 MA, + 6 volts @ 6.0 MA

Each Output - True = -6 volts @ 10 MA to ground.
- False = 1.0 volts @ 2 MA to negative.

-18 volts @ 150 MA

Each output - ¹ True = -13.8 volts @ 150 MA
Rise time 0.5 microseconds
² False = -0.1 volts @ 2.0 MA

¹ When driving #330 lamp, or equivalent, 80 MA is required by lamp, 70 MA is available for external use.

² When driving #330 lamp, or equivalent.

-18 volts @ 11.0 MA
-14 volts @ 1.5 Amperes or 150 MA per stage in true state

Each output - True = -2.25 volts @ 150 MA
*False = -18 volts @ 1.5 MA
* With AO 30115 driving type G crossbar coil

-18 volts @ 20 MA. To this add 120 MA for each G crossbar actuator driven at any given time.

Each output - True = -6 volts @ 10 MA to ground
- False = -1.0 volts @ 2 MA max.

Power Supply Requirements: -18 volts @ 90 MA

Each output - ¹ True = -13.8 volts @ 150 MA
² False = 0.1 volts @ 2.0 MA

¹ When driving #330 lamp, or equivalent, 80 MA is required by lamp, 70 MA is available for external use.

² When driving #330 lamp, or equivalent.

-18 volts @ 7.0 MA
-14 volts @ 900 MA, or 150 MA per stage in true state

Each output - True = -2.25 volts @ 150 MA
- *False = -18 volts @ 1.5 MA
* With AO 30118 driving type G crossbar coil.

-18 volts @ 13.0 MA. To this add 120 MA for each G crossbar actuator driven at any given time.

False = -0.25 volts @ 100 MA with load impedance greater than 180 ohms at -18 volts.
True = -11.5 volts @ 2.5 MA with load impedance greater than 4000 ohms to ground.

-18 volts @ 65 MA
+ 6 volts @ 5.0 MA

Each output - True = -6 volts @ 1.5 MA to ground.
- False = 1.0 volts @ 1 MA to negative

-18 volts @ 22 MA.

Each output - True = -6 volts @ 1.5 MA to ground
- False = 1.0 volts @ 1 MA to negative

-18 volts @ 22 MA.

Each output - True = -6 volts @ 1.5 MA to ground.
- False = 1.0 volts @ 1 MA to negative

-18 volts @ 22 MA.

Each output - True = -6 volts @ 1.5 MA to ground
- False = 1.0 volts @ 1 MA to negative

-18 volts @ 22 MA.

Each output - True = -6 volts @ 1.5 MA to ground
- False = 1.0 volts @ 1 MA to negative

-18 volts @ 22 MA.

"On" condition: -.25V, 100 MA from a negative source (Electron flow to the card) internal impedance 2.5 ohms.
"Off" condition: -18V, internal impedance 2K ohms.

-18 volts @ 54 MA, + 6 volts at 20 MA.

"On" condition: .25 volts, 100 ma from a negative source (Electron flow to the card) internal impedance 2.5 ohms.
"Off" condition: -18 volts, internal impedance 2K ohms.

-18 volts @ 90 MA, + 6 volts at 35 MA.

POWER SUPPLY

The power supply provides the 3 voltages required for Cunningham Logic Bloc Printed Circuit Cards. The primary supply is -18 volts, regulated to 100 mv dc maximum vs. line and load. Ripple is less than 120 mv. A -14 volt supply, derived from the -18 volts, is used for visual readout, electrical readout, and biasing. Regulation is the same as the -18 volt supply, plus 30 mv. A small -6 volt supply is included for biasing; regulation for this is .7 v vs. line and load.

The current ratings of the three outputs are:

For the 18 volt supply: 2.05 amperes

14 volt supply: 700 ma

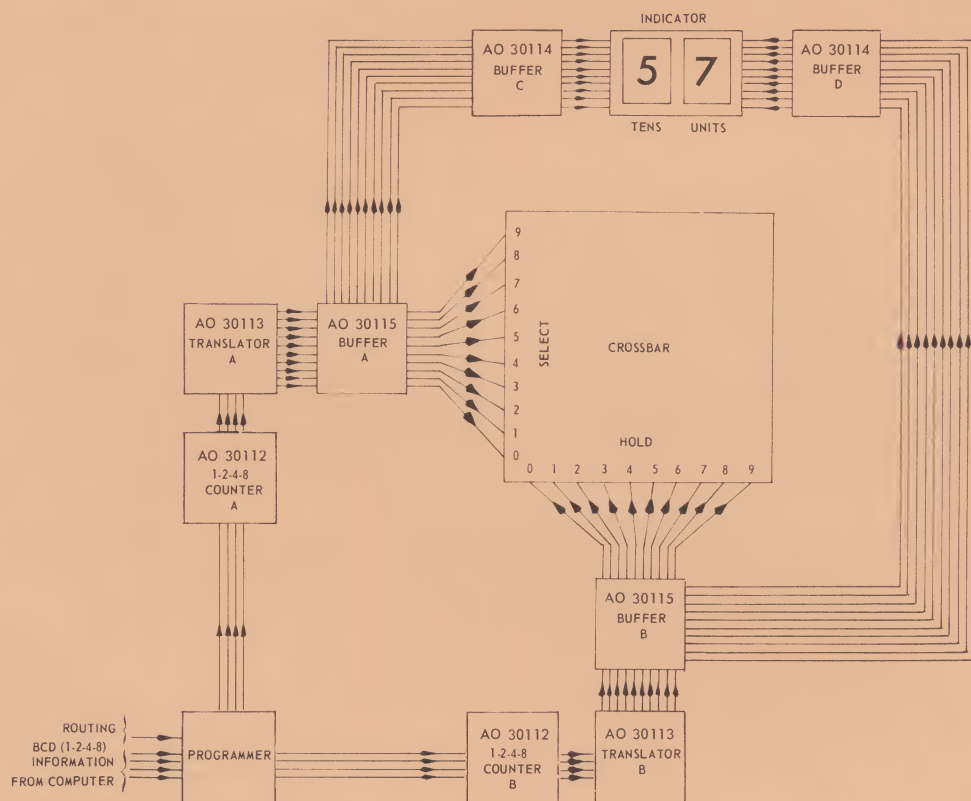
6 volt supply: 300 ma

Dimensions are: 17" Wide

4-25/32" Deep

6-15/16" High

TYPICAL SUBSYSTEM



A TYPICAL SUBSYSTEM COMPOSED OF INTEGRATED CUNNINGHAM LOGIC MODULES

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